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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/658,371

09/10/2003

Kouji Matsuo

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7590

01/21/2005

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EXAMINER

WILSON, ALLAN R

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 01/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/658,371

Applicant(s)

MATSUO, KOUJI

Examiner

Allan R. Wilson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 14-21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 7-12 is/are rejected.
- 7) ☒ Claim(s) 5,6 and 13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 09/10/2003.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Examiner's Amendment

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

The application has been amended as follows:

In the title, delete “and method of manufacturing the same.

Claim Objections

Claim 2 is objected to because of the following informalities:

In claim 2, “a second gate electrode film provided on the gate insulating film of the P-channel MISFET and composed of a second metal silicide” and “the second gate electrode film includes at least one material selected from the first metal material and a third metal silicide” is confusing. The second gate electrode could be composed of a second and third metal silicide or just a third metal silicide as assumed by the Examiner. Claim 2 should be an independent claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 1 is rejected under 35 U.S.C. § 102(b) as being anticipated by Liang et al.

(“Liang”) U.S. Patent No. 6,130,123.

With regards to claim 1, Liang illustrates in figures 1-14, particularly figure 11, (entire document) a semiconductor substrate 100; an N-channel MISFET 115 and a P-channel MISFET 105 provided on the semiconductor substrate, each of the N and P channel MISFETs being isolated by an isolation region 110 and having a gate insulating film 120; a first gate electrode film provided on the gate insulating film of the N-channel MISFET and composed of a first metal silicide 130 (for example TaSi₂); a second gate electrode film provided on the gate insulating film of the P-channel MISFET and composed of a second metal silicide 165 (for example MoSi₂) made of a second metal material different from a first metal material composing the first metal silicide (col. 7, lines 1-4); and a work function ≈ 4.35 of the first gate electrode film being lower than that of the second gate electrode film ≈ 4.42 .

Claims 1-4 and 7-9 are rejected under 35 U.S.C. § 102(e) as being anticipated by Lin et al. ("Lin") U.S. Patent No. 6,475,908.

With regards to claims 1 and 2, Lin illustrates in figures 1-13, particularly figure 13, (entire document) a semiconductor substrate 10; an N-channel MISFET and a P-channel MISFET (col. 1, lines 17-33) provided on the semiconductor substrate, each of the N and P channel MISFETs being isolated by an isolation region 12 and having a gate insulating film 60; a first gate electrode film provided on the gate insulating film of the N-channel MISFET and composed of a first metal silicide MSi_x ; a second gate electrode film provided on the gate insulating film of the P-channel MISFET and composed of a third metal silicide MSi_y made of a first metal material; and a work function of the first gate electrode film being lower than that of the second gate electrode film col. 6, lines 60-65.

With regards to claim 3, Lin illustrates in fig. 13 said one material selected from the first metal material and the third metal silicide MSi_y being present at an interface being in contact with at least the gate insulating film 60.

With regards to claim 4, the examiner had to assume what the product would be by the process claimed. For example, in claim 4 it was assumed that the product was the third metal silicide. The claim that it was "a precipitation layer" was not considered to have full patentable weight. A "product by process" claim is directed to the product per se, no matter how actually made, MPEP 2113 "Product-by-Process Claims," In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90; In re Marosi et al, 218 USPQ 289; and particularly In re Thorpe, 227 USPQ 964, all of which make it clear that it is the patentability of the final product per se which must be

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determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above case law makes clear.

With regards to claim 7, Lin discloses in col. 6, lines 55-65, the number of silicon atoms per unit volume 1×10^{22} and 1×10^{23} ions/cm³ is not more than the number of metal atoms per unit volume in the composition ratio between silicon and metal composing the third metal silicide.

With regards to claim 8, Lin discloses in col. 6, lines 35-40, the first metal silicide MSi_x is tungsten silicide.

With regards to claim 9, Lin discloses in col. 6, lines 35-40, the second metal silicide MSi_y is composed of at least one kind of metal silicide selected from the metal silicides of platinum and palladium.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 10 are rejected under 35 USC § 103 (a) as being unpatentable over Liang as applied to claims 1 above.

With regards to claim 10, Liang is discussed above, it does not show one material selected from the metal film and the metal silicide film is provided on source and drain regions.

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Liang does illustrates V_{SS} and V_{CC} connected to the source and drain regions. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have V_{SS} and V_{CC} made from one material from the metal film or the metal silicide film to provide a connection and not have to use another material which would complicate making the device.

With regards to claim 11, Liang discloses in col. 1, lines 34-47, said one material selected from the metal film and the metal silicide film provided on the source and drain regions of the N-channel MISFET is composed of one material selected from at last one kind of metal film and metal silicide film selected from zirconium, tantalum, and niobium.

With regards to claim 12, Lin discloses in col. 6, lines 35-40, one material selected from the metal film and the metal silicide film provided on the source and drain regions of the P-channel MISFET is composed of one material selected from at last one kind of metal film and metal silicide film selected from platinum and palladium.

Allowable Subject Matter

Claims 5, 6 and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Kunishima et al. (discloses a CMOS-FET with different types of silicide) and Lin et al. (6,750,519, illustrates the same a '908 above).

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Field of Search	Date
U.S. Class and subclass: 257/204, 338, 369, 407	January 18, 2005
Other Documentation: None	N/A
Electronic data base(s): EAST (USPAT, US-PGPUB, JPO, EPO, Derwent, IBM TDB)	January 18, 2005

Any inquiry concerning this communication or earlier communications from an examiner should be directed to Primary Examiner Allan Wilson whose telephone number is (571) 272-1738. Examiner Wilson can normally be reached 7:00-4:00 Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Allan R. Wilson
Primary Examiner
January 18, 2005